UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,026	04/21/2005	Yves-Marie Morgan	33901-174PUS	6761

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Thomas Langer
Cohen Pontani Lieberman & Pavane
551 Fifth Avenue Suite 1210
New York, NY 10176

EXAMINER
PEREZ, JAMES M

ART UNIT	PAPER NUMBER
2611	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

		Application No.	Applicant(s)
		10/532,026	MORGAN ET AL.
Office Action Summary		Examiner	Art Unit	
		James M. Perez	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 April 2005*.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 April 2005* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☒ All   b)☐ Some * c)☐ None of:

        1.☒ Certified copies of the priority documents have been received.

        2.☐ Certified copies of the priority documents have been received in Application No. _____.

        3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date *4/21/2005 and 6/21/2005*.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

Detailed Action

Drawings

1.   The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the interference canceling stage of claim 10 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 1-2, 4, and 7-8 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Shirakata (USPN 6993083) in view of Labat (USPN 5909466).

With regards to claims 1 and 8, Shirakata teaches a method and digital communication

receiver for synchronizing symbols at the output of an equalizer, characterized in an

equalizer apparatus and method, comprising:

on sending, inserting into a succession of sent symbols, one or more known

sequences of symbols repeated in said succession of symbols (col. 12, lines 13-30),

detecting said one or more known sequences at the output of said equalizer (col.

12, lines 13-30 and col. 22, lines 59-67),

deducing any shifting of the symbols at the output of the blind equalizer from the

result of said detection (col. 24, line 32 through col. 25, line 22), and

retiming the symbols at the output of the blind equalizer as a function of the

deduced shift (col. 24, line 32 through col. 25, line 22).

Shirakata does not explicitly teach that the equalizer is a blind equalizer.

Labat teaches that a blind equalizer with phase error compensation (col. 6, lines

28-37, lines 49-58, and col. 8, lines 29-40).

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to combine the synchronization and equalization method of Shirakata with the adaptive blind equalizer circuit of Labat in order to create an improved digital equalization system and method capable of improved convergence and tracking, while adapting to channel fluctuations in severe situations (Labat: col. 5, lines 1-15).

With regards to claim 2, Shirakata in view of Labat teaches a method according to claim 1. Shirakata further teaches a method characterized in that:

detecting a known sequence inserted, on sending, into a succession of symbols, the symbols at the output of the equalizer (fig. 15: elements 801, 903, 804, 805, and 902: col. 12, lines 13-30 and col. 22, lines 59-67).

correlation of a known sequence (or symbol) and the resulting correlation peaks are detected (fig. 1: elements 105-109 and 112).

Shirakata does not explicitly teach that the known pilot is correlated. One of ordinary skill in the art at the time of the invention would clearly recognize that correlation of a pilot symbol is well known in the art. Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to perform correlation on the known pilot symbol in order to extract the known pilot symbol and detect the resulting correlation peaks in order to more accurately determine the pilot symbol location in time and thus have more accurate phase error correction.

With regards to claim 4, Shirakata in view of Labat teaches a method according to claim 2. Shirakata further teaches a method characterized in that:

the result of said correlation (pilot extractor) is used to determine information on the phase of the signal carrier that carries the received symbols and that information is used to resolve ambiguity as to the phase of the symbols at the output of the equalizer (col. 23, lines 24-32, and col. 24, line 32 through col. 25, line 22).

With regards to claim 7, Shirakata in view of Labat teaches a method according to claim 1. Shirakata does not explicitly teach the method characterized in that the blind equalizer has a switchable structure, uses a switchable algorithm, and, in a convergence mode of operation, includes in cascade a purely recursive whitening filter and a matched transversal filter that is reinitialized as a function of the performance of the equalizer.

Labat teaches the method characterized in that the blind equalizer has a switchable structure, uses a switchable algorithm (col. 6, lines 23-45), and

in a convergence mode of operation, includes in cascade a purely recursive whitening filter and a matched transversal filter that is reinitialized as a function of the performance of the equalizer (col. 6, line 49 through col. 7, line 49).

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to combine the synchronization and blind equalization method of Shirakata in view of Labat with the adaptive blind equalizer circuit of Labat in order to create an improved digital equalization system and method capable of improved convergence and

tracking, while adapting to channel fluctuations in severe situations (Labat: col. 5, lines 1-15).

4.   Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shirakata (USPN 6993083) in view of Labat (USPN 5909466) as applied to claim 2 above, and further in view of Peon (USPN 7027499).

With regards to claim 3, Shirakata in view of Labat teaches a method according to claim 2. Shirakata in view of Labat are silent to teaching a method characterized in that detected correlation peaks are compared to a given threshold and the symbols are not retimed unless a peak higher than said threshold is detected.

Peon teaches a method characterized in that detected correlation peaks are compared to a given threshold and that no corrective action is taken unless a peak higher than said threshold is detected (col. 4, line 45 through col. 5, line 29: $M = 1$ and $M > 1$). One of ordinary skill in the art at the time of the invention would clearly recognize that taking no corrective action if the correlative peaks are less than said threshold value could apply to any corrective action such as retiming of symbols.

Therefore it would be obvious to one of ordinary skill at the time of the invention to combine the synchronization and blind equalization method and system of Shirakata in view of Labat with the corrective action correlation and threshold logic of Peon in order to reduce the power consumption of a digital system.

5.   Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Shirakata (USPN 6993083) in view of Labat (USPN 5909466), and further in view of Lin

(USPN 6813325).

With regards to claim 5, Shirakata in view of Labat teaches a method according to claim

1.

    Shirakata teaches the retiming of frames at the output of the equalizer (col. 2,

line 59 through col. 3, line 5; and col. 24, line 32 through col. 25, line 22).

    Shirakata in view of Labat are silent to teaching a method characterized in that:

to retime frames, symbols are eliminated from or added to the succession of symbols at

the output of the equalizer between the sequence for which a shift is detected and the

preceding sequence.

    Lin teaches a method characterized in that: to retime frames, symbols are

eliminated from or added to the succession of symbols between the sequence for which

a shift is detected and the preceding sequence (col. 3, lines 45-65; col. 7, lines 9-48;

and col. 9, lines 5-32).

    Therefore it would be obvious to one of ordinary skill in the art at the time of the

invention to combine the synchronization and blind equalization method and system of

Shirakata in view of Labat with the frame synchronization via add/delete bit function as

disclosed in Lin in order to create a system and method for achieving reduced timing

wander in a communication system (Lin: col. 1, lines 10-18).

With regards to claim 6, Shirakata in view of Labat in further view of Lin teaches a method according to claim 5.

Shirakata in view of Labat are silent to teaching a method characterized in that: symbols are eliminated just after the sequence preceding the sequence for which a shift is detected.

Lin teaches a method characterized in that: symbols are eliminated just after the sequence preceding the sequence for which a shift is detected (col. 3, lines 45-65; col. 7, lines 9-48; and col. 9, lines 5-32).

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to combine the synchronization and blind equalization method and system of Shirakata in view of Labat with the frame synchronization via add/delete bit function as disclosed in Lin in order to create a system and method for achieving reduced timing wander in a communication system (Lin: col. 1, lines 10-18).

6.   Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shirakata (USPN 6993083) in view of Labat (USPN 5909466) as applied to claim 8 above, and further in view of Laot (Turbo Equalization: Adaptive Equalization and Channel Decoding Jointly Optimized).

With regards to claim 9, Shirakata in view of Labat teaches a receiver according to claim 8. Shirakata in view of Labat teaches the blind equalizer (disclosed in claim 8).

Shirakata in view of Labat are silent to teaching a receiver characterized in that it

includes a turboequalization system of which an equalizer in a first stage.

Laot teaches a receiver characterized in that it includes a turboequalization

system of which an equalizer in a first stage (fig. 1 and 2: page 2 whole).

Therefore it would be obvious to one of ordinary skill in the art at the time of the

invention to combine the synchronization and blind equalization method of Shirakata in

view of Labat with the turboequalization receiver of Laot in order to create an improved

receiver capable of drastically reduced inter-symbol interference (Laot: abstract).

With regards to claim 10, Shirakata in view of Labat teaches a receiver and blind

equalizer according to claim 8.

Shirakata teaches a receiver including an equalizer and the known sequences

used to retime the symbols at the output of the equalizer are sequences; and

detecting said one or more known sequences at the output of said equalizer (col.

12, lines 13-30 and col. 22, lines 59-67),

Shirakata is silent to teaching two limitations: Limitations 1) said equalizer is a

blind equalizer; and Limitation 2) receiver that it includes an interference canceling

stage on the downstream side of the equalizer and the known sequences used to retime

the symbols at the output of the blind equalizer are sequences also used for training

said interference canceling stage.

Limitation 1)

Labat teaches that a blind equalizer with phase error compensation (col. 6, lines 28-37, lines 49-58, and col. 8, lines 29-40) and a known .

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to combine the synchronization and equalization method of Shirakata with the adaptive blind equalizer circuit of Labat in order to create an improved digital equalization system and method capable of improved convergence and tracking, while adapting to channel fluctuations in severe situations (Labat: col. 5, lines 1-15).

Limitation 2)

Laot teaches a receiver that it includes an interference canceling stage on the downstream side of the equalizer (figs. 1 and 2: page 2: ISI: in the case where module 1 is a blind equalizer and module 2 is the disclosed turboequalizer) and wherein the known sequences at the output of the equalizer (module 1) are sequences also used for training said interference canceling stage (figs. 1 and 2: page 2: module 1 and module 2 and ISI: and page 6: wherein in training symbol are a known sequence).

Therefore it would be obvious to one of ordinary skill in the art at the time of the invention to combine the synchronization and blind equalization method of Shirakata in view of Labat with the turboequalization and cascade receiver of Laot in order to create an improved receiver capable of drastically reduced inter-symbol interference (Laot: abstract).

Conclusion

7.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Mailaender (USPN 7167507) teaches that correlation of a known pilot signal (col. 2, lines 10-15 and col. 6, lines 10-15) is well known in the art at the time of the invention.

8.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Perez whose telephone number is 571-270-3231. The examiner can normally be reached on Monday through Friday: 9am to 5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

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USPTO Customer Service Representative or access to the automated information

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JP
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SHUWANG LIU
SUPERVISORY PATENT EXAMINER